QUANTITATIVE ANALYSIS OF THE ECONOMIC FLOWS BETWEEN PORTUGAL AND THE OTHER EUROPEAN UNION MEMBER STATES AND INSTITUTIONS IN 1997

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Documento de Trabalho Nº 2/03

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(*March **2003***)**

Abstract

In a "top-down" approach, for which the starting point should be the building of an aggregated Social Accounting Matrix (SAM) based on the country's national accounts statistics, a SAM will be built for the Portuguese economy in 1997.

The SAM will be shown as a work instrument for quantifying the flows in the economic circuit and for simulating resulting effects of changes in such flows.

The full consonance with the National Accounting System will be demonstrated identifying the identities and balances of the various internal accounts of the System in the constructed SAM.

The economic flows between Portugal and the other European Union Member States and Institutions will be emphasised and the accounting multipliers that are calculated will facilitate the study of the resulting effects of changes in these flows. The impact of a total cut in investment grants from the European Union to the Portuguese economy will be studied.

Key Words: Social Accounting Matrix; Economic Planning; Economic Policy; Sectorial Studies; Macroeconomic Studies

JEL Classification: E66 – (Macroeconomic – Aspects of Public Finance, Macroeconomic Policy, and General Outlook) General Outlook and Conditions; O11 – (Economic Development) Macroeconomic Analyses of Economic Development; O50 – (Economy wide Country Studies) General

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A. Introduction

Usually known as SAM, the Social Accounting Matrix is the work instrument used in this paper to make a "quantitative analysis of the economic flows between Portugal and the other European Union Member States and Institutions in 1997"[1].

Compiled from the Portuguese System of National Accounts (SNA), the constructed SAM was designed for such a purpose and can be seen as its matrix presentation, as it will be shown in part C.

SNA and SAM are frameworks or systems that, within a given period of time (for us the year of 1997), encompass every transaction of an economy, giving a more or less "detailed record of the complex economic activities taking place within an economy and of the interaction between the different economic agents, and groups of agents, that takes place on markets or elsewhere" (ISWG93, paragraph 1.1).

On the one hand, the national accounts are presented in a large number of T-tables, which are balance sheets of certain economic flows where every transaction appears twice: once as expenditure or outlay of an account and once as a receipt or income of another account. On the other hand, the SAM presentation is a table where each transaction is recorded once only in a cell of its own – by convention the entries in rows are incomes or receipts and the entries in columns are outlays or expenditures, so, for each row of the SAM there is a corresponding column. That is to say, for every income there exists a corresponding expenditure. The SAM is therefore square with an identical series of row and column headings for which each pair is balanced, i.e. they have the same total. Therefore, by linking production (factors and activities/products) and institutions (households, enterprises, government and others) in the economy, it can be seen as a general equilibrium data system, as it will be shown in part B.

"As a data framework, the SAM is a comprehensive and disaggregated snapshot of the economic system during a given year. It provides a classification and organizational scheme for the data useful to analysts and policymakers alike" (Thorbecke, 2001). SAM modelling, which will be seen in one of its more simple form, shows this in part D.

[1] The present working-paper is based on the author's interventions at the *5th International workshop on the European Economy,* which took place in Lisbon on 22nd November 2002, entitled "Quantitative analysis of the economic flows between Portugal and the other European Union Member States and Institutions in 1997" and at the *16th Department of Economics' Seminar*, which took place in Lisbon on 28th January 2003, entitled "Social Accounting Matrix Modelling. An application to Portugal in 1997".

In part E, we will conclude that the SAM is a work instrument providing a database that can be especially designed for specific economic analysis, as well as decision-taking and decision making; its improvement and institutionalisation therefore represent a challenge.

B. The SAM structure and the specification of the adopted accounts classification

The taxonomy used in a SAM depends on the available data and the purposes of the study underlying its construction. It is, however, fundamental for the success of any analysis, that there should be a definition of an appropriate classification and a characterisation of the production and institutional sub sectors.

The design of the SAM presented here was defined as being centred upon the aim of making a very simple "quantitative analysis of the economic flows between Portugal and other European Union Member States and Institutions", showing it as a work instrument to make more complex things. Also influencing its design were the available data and previous experience in the construction of SAMs.

Constantly concerned with adopting a mutually exclusive and, in a certain way, exhaustive classification, the adopted disaggregation respected, on the one hand, the functional criterion, describing the production processes and pointing out the existing technical-economic relationships between the various productive units and, one the other hand, it respected the institutional criterion, describing distribution, accumulation and financing activities and showing the relationships in economic behaviour. Therefore we have the "Production" divided into factors of production, activities and products and the "Institutions" divided into current and capital[2] accounts. We also considered an "errors and omissions" account, which, as we shall see, will assume values that are perfectly justified by the national accounting system.

In a general way, the order of the accounts does not obey to any specific rule; it just obeys the criterion of the one who works them. Our criterion of ordering the accounts was the one that lies behind the Basic **SAM**, which is shown below.

[2] In previous works, a financial account was also included. In this particular case, it was not possible to produce such an account due to lack of available information.

Basic SAM

Outlays / Incomes		Production			Institutions		Rest of the World (RW)	Errors and Omissions	TOTAL
		Factors	Activities	Products	Current A.	Capital A.			
Production	Factors	0	Added Value (a)	0	0	0	Compensation of Factors from the RW	0	Aggregate Income of Factors
Production	Activities	0	0	Production	0	0	0	0	Production Value
Production	Products	0	Intermediate Consumption	0	Final Consumption	Gross Capital Formation	Exports (d)	0	Aggregate Demand
Institutions	Current Account	National Product	Other net taxes on production	Net taxes on products	Current Transfers	0	Current Transfers from the RW	0	Aggregate Income
Institutions	Capital Account	0	0	0	Domestic Saving	Capital Transfers	Capital Transfers from the RW	Net borrowing/ lending	Investment Funds
Rest of the World		Compensation of Factors to the RW	Other net taxes on production	Imports (b)	Current Transfers to the RW (c)	Capital Transfers to the RW	X	0	Transactions Value to the RW
Errors and Omissions		0	0	Commercial Margins	0	0	Net borrowing/ lending	0	Net borrowing/ lending
TOTAL		Aggregate Income of Factors	Total Costs	Aggregate Supply	Aggregate Income	Aggregate Investment	Transactions Value from the RW	Net borrowing/ lending	X

(a) Gross Added Value at factors cost.

(b) Includes net taxes on products that are receipts from the European Union Institutions.

(c) Includes direct purchases abroad by residents.

(d) Includes direct purchases in domestic market by non-residents.

We will now consider the “articulation” that can be established among the several accounts.

There are transactions within the domestic economy and between it and the rest of the world (6th column/6th row, of the basic SAM).

On the one hand, the production activities buy "inputs" (intermediate consumption) and services of the factors of production to produce products generating, in the production process, the added value. The only receipts of the activities come from the sales of its production in the products market, which are spent in intermediate consumption, in the payment of services to the factors of production and in the payment of net taxes (taxes less subsidies) to the general government and the institutions of the European Union. We have, therefore, the value of the production in balance with the total costs of the economy (see the «activities» account, 2nd column/2nd row of the basic SAM).

On the other hand, the factors of production will sell services to the production activities (domestic and foreign) receiving an income from this. Due to the fact that factor services are offered by institutions (both domestic and foreign), their payment is made both to domestic and foreign institutions (see the «factors of production» account, 1st column/1st row, of the basic SAM).

The other sources of income of the domestic institutions are the net taxes and the current transfers, as one can see by its current account, which also shows how the income is spent in final consumption and current transfers (within the domestic economy or with the rest of the world) or is saved (see the 4th column/4th row of the basic SAM).

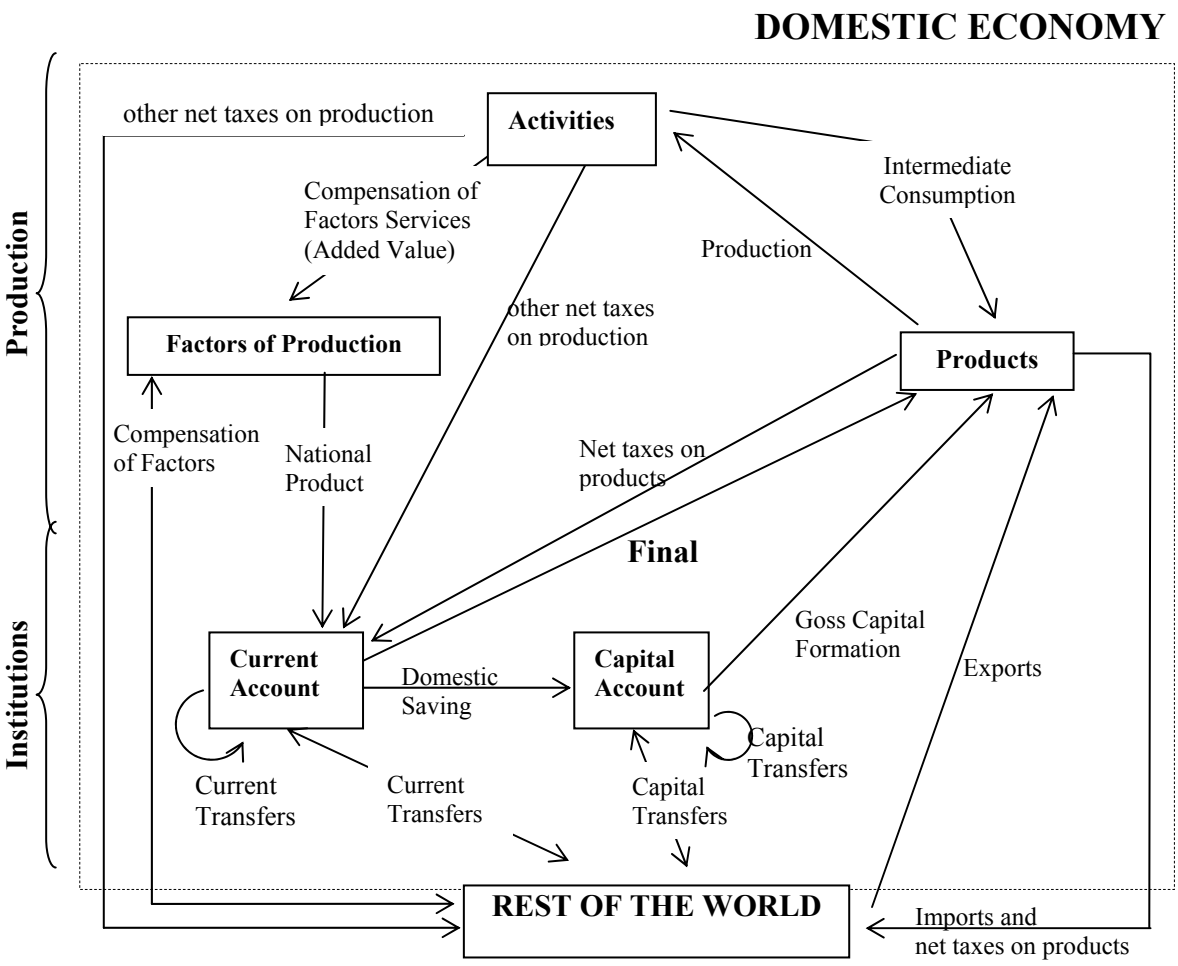
Through the products accounts, there is supply and demand of the same ones. As sources of demand, there is intermediate consumption, final consumption, gross capital formation (gross fixed capital formation added to the change in stocks) and exports. By the side of supply, we have production and imports, to which are joined the net taxes on the products and the commercial margins (see the 3rd column/3rd row of the basic SAM). The products accounts can be seen as the accounts of those that perform intermediation activities, in other words, that acquire or import the products, that

organise the processing (transports and storage), add the corresponding margins to the price, pay indirect taxes to the government, sell the products to the producers, households, government and abroad, in other words, they place the products in the market (Robinson, 1986).

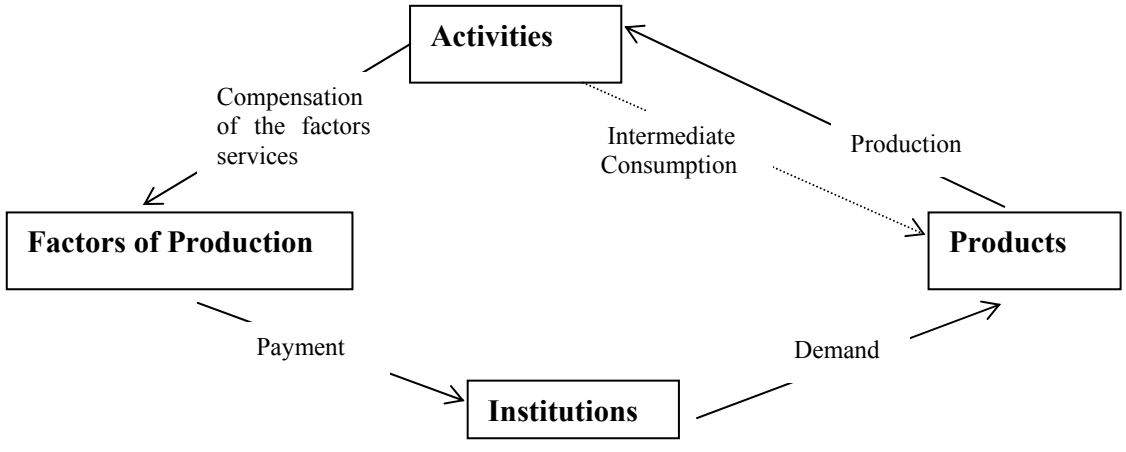
The capital, or the accumulation of capital, account shows two things. On the one hand, investments made through the gross capital formation and transfers of capital (within the economy and abroad). On the other hand, available funds for these investments are savings and capital transfers, as well as a balance (depending on their sign) corresponding to the financing need or capacity (see the 5th column/5th row of the basic SAM).

Apart from all the referred accounts, there is still the "errors and omissions" account, introduced because of the need to consider the balance of the capital transactions and the rest of the world, on the one hand, and the commercial margins, on the other (see the 7th column/7th row of the basic SAM).

Following the flows of money, the following outline gives us the connections that can be established between the various accounts.



Within the Domestic Economy, in a more condensed way (not considering the net indirect taxes - that is, the taxes on products and the other taxes on production, and the transfers verified among the several accounts of the institutions), the previous outline/diagram can be presented as the following.



We can therefore conclude that SAM is the numeric representation of the cycle, production - income - expenditure. It "shows how sectoral value added accrues to production factors and their institutional owners; how these incomes, corrected for net current transfers, are spent; and how the expenditures on commodities lead to sectoral production and added value" (Keuning & Ruijter, 1988) – using the words of Thorbecke (2001): "it can readily be seen that it incorporates all major transactions within a socio-economic system".

It is also important to bear in mind that "a SAM applies the properties of a matrix format to incorporate specific details on various economic flows"(ISWG, 1993, paragraph 20.26).

In the constructed matrix, it was decided to undertake some further disaggregation of the framework described above, always obeying the National Accounts Nomenclature, in the following way: the factors of production account were disaggregated into labour and capital and the activities and products accounts into primary, secondary and tertiary groups[3]; then, the current and capital accounts of the institutions were divided into households, enterprises (non-financial corporations), government (general government), and the other institutions (financial corporations and non-profit institutions serving households). The rest of the world was disaggregated into European Union (EU) (member states and institutions) and others (third countries and international organisations).

As the one constructed for Portugal, the SAM that can be seen in the following tables (see the description of its cells contents in the Annexes), makes it possible to break down each account into categories, using on occasions sources of information other than the National Accounts, without losing the consistency of the whole system, that is to say, "a crucial feature is the wide range of possibilities for expanding or condensing such a matrix in accordance with specific circumstances and needs"(ISWG, 1993, paragraph 20.6)

[3] The primary group includes agriculture, forestry and fishing (activities/products 01 to 05 of the National Accounts). The secondary group includes industry, including energy and construction (activities/products 10 to 45 of the National Accounts). The tertiary group includes the rest of the economy (activities/products 50 to 95 of the National Accounts).

Portugal 1997 (million Euros)

Outlays (Expenditures) / Incomes(Receipts)				PRODUCTION												INSTITUTIONS		
				Factors of Production			Activities				Products				Current Account		
				Labour	Capital	Sum	Primary	Secondary	Tertiary	Sum	Primary	Secondary	Tertiary	Sum	Households	Entreprises	Government
				1	2		3	4	5		6	7	8		9	10	11
PRODUCTION	Factors of Production	Labour	1	0	0	0	640	13.788	30.157	44.585	0	0	0	0	0	0	0
		Capital	2	0	0	0	3.058	11.828	21.750	36.635	0	0	0	0	0	0	0
		Sum		0	0	0	3.697	25.615	51.907	81.220	0	0	0	0	0	0	0
	Activities	Primary	3	0	0	0	0	0	0	0	5.965	391	19	6.376	0	0	0
		Secondary	4	0	0	0	0	0	0	0	0	80.396	587	80.983	0	0	0
		Tertiary	5	0	0	0	0	0	0	0	4	208	92.062	92.274	0	0	0
		Sum		0	0	0	0	0	0	0	5.970	80.995	92.668	179.633	0	0	0
	Products	Primary	6	0	0	0	583	4.843	479	5.905	0	0	0	0	2.634	0	20
		Secondary	7	0	0	0	1.935	44.150	14.774	60.859	0	0	0	0	31.304	0	806
		Tertiary	8	0	0	0	317	6.428	25.333	32.078	0	0	0	0	33.158	0	6.389
		Sum		0	0	0	2.835	55.421	40.586	98.842	0	0	0	0	67.097	0	7.214
INSTITUTIONS	Current Account	Households	9	35.157	20.991	56.149	0	0	0	0	0	0	0	0	451	1.465	21.525
		Entreprises	10	1.457	13.042	14.500	0	0	0	0	0	0	0	0	0	78	4
		Government	11	6.877	-925	5.951	-96	-50	-219	-366	1	8.737	3.276	12.014	9.249	2.995	9.058
		Others	12	1.118	2.317	3.436	0	0	0	0	0	0	0	0	1.687	516	1.132
		Sum		44.610	35.426	80.035	-96	-50	-219	-366	1	8.737	3.276	12.014	11.387	5.053	31.719
	Capital Account	Households	13	0	0	0	0	0	0	0	0	0	0	0	6.417	0	0
		Entreprises	14	0	0	0	0	0	0	0	0	0	0	0	0	9.961	0
		Government	15	0	0	0	0	0	0	0	0	0	0	0	0	0	400
		Others	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Sum		0	0	0	0	0	0	0	0	0	0	0	6.417	9.961	400
REST OF THE WORLD		EU	17	60	3.303	3.364	-60	-3	0	-63	1.216	22.032	2.676	25.924	1.382	35	353
		Others	18	41	1.403	1.444	0	0	0	0	470	6.615	1.164	8.249	463	10	190
		Sum		101	4.707	4.808	-60	-3	0	-63	1.685	28.647	3.841	34.173	1.845	46	543
Errors and Omissions			19	0	0	0	0	0	0	0	1.309	17.500	-18.809	0	0	0	0
TOTAL				44.711	40.133	84.843	6.376	80.983	92.274	179.633	8.965	135.878	80.976	225.819	86.745	15.060	39.877

Source: Portuguese National Accounts

Portugal 1997 (million Euros)

Outlays (Expenditures) / Incomes(Receipts)				INSTITUTIONS							REST OF THE WORLD			Errors and Omissions	TOTAL
				Current Account		Capital Account									
				Others	Sum	Households	Entreprises	Government	Others	Sum	EU	Others	Sum		
				12		13	14	15	16		17	18		19	
PRODUCTION	Factors of Production	Labour	1	0	0	0	0	0	0	0	67	59	126	0	44.711
		Capital	2	0	0	0	0	0	0	0	2.036	1.461	3.497	0	40.133
		Sum		0	0	0	0	0	0	0	2.103	1.520	3.623	0	84.843
	Activities	Primary	3	0	0	0	0	0	0	0	0	0	0	0	6.376
		Secondary	4	0	0	0	0	0	0	0	0	0	0	0	80.983
		Tertiary	5	0	0	0	0	0	0	0	0	0	0	0	92.274
		Sum		0	0	0	0	0	0	0	0	0	0	0	179.633
	Products	Primary	6	0	2.654	134	4	2	0	140	209	56	265	0	8.965
		Secondary	7	0	32.110	5.560	10.461	4.035	1.331	21.387	16.971	4.552	21.523	0	135.878
		Tertiary	8	0	39.547	836	1.807	13	192	2.848	5.128	1.375	6.503	0	80.976
		Sum		0	74.311	6.530	12.272	4.051	1.523	24.376	22.308	5.983	28.291	0	225.819
INSTITUTIONS	Current Account	Households	9	3.885	27.326	0	0	0	0	0	1.949	1.321	3.270	0	86.745
		Entreprises	10	460	542	0	0	0	0	0	11	8	18	0	15.060
		Government	11	439	21.741	0	0	0	0	0	499	39	537	0	39.877
		Others	12	117	3.452	0	0	0	0	0	26	17	43	0	6.931
		Sum		4.901	53.061	0	0	0	0	0	2.485	1.384	3.869	0	148.613
	Capital Account	Households	13	0	6.417	0	0	307	96	403	126	59	184	-941	6.063
		Entreprises	14	0	9.961	0	0	1.120	0	1.120	1.040	17	1.056	1.060	13.197
		Government	15	0	400	334	69	2.754	9	3.166	1.639	123	1.762	3.325	8.653
		Others	16	1.956	1.956	0	0	364	96	460	2	0	2	-694	1.724
		Sum		1.956	18.734	334	69	4.545	201	5.148	2.807	198	3.005	2.750	29.637
REST OF THE WORLD		EU	17	58	1.828	-1.322	1.288	80	1	47	0	0	0	0	31.100
		Others	18	15	679	521	-432	-23	0	66	0	0	0	0	10.438
		Sum		73	2.507	-800	856	57	1	114	0	0	0	0	41.538
Errors and Omissions			19	0	0	0	0	0	0	0	1.398	1.352	2.750	0	2.750
TOTAL				6.931	148.613	6.063	13.197	8.653	1.724	29.637	31.100	10.438	41.538	2.750	X

Source: Portuguese National Accounts

C. Association with the System of National Accounts

Because the National Accounts were the base information source of the constructed SAM, almost all the flows that are part of that System are integrated in it.
The System of National Accounts adopted in Portugal in 1997, the year for which we constructed the SAM, was the European System of National and Regional Accounts in the European Community of 1995 - ESA 95 (Eurostat, 1996), which has as base the version of 1993 of the International United Nations System of National Accounts - SNA 93, prepared by the Inter-Secretariat Working Group and published by the United Nations Statistical Office (ISWG, 1993). To the last, "a SAM is defined as the presentation of SNA accounts in a matrix which elaborates the linkages between a supply and use table and institutional sector accounts" (ISWG, 1993, paragraph 20.4).

Next we are going to identify the identities and balances of the several accounts of the Portuguese System of National Accounts in the constructed SAM, referring each one of them to an aspect of the economic circuit. As uses and resources, always in millions of euros, we will use the designations that we used for the various accounts of the SAM. We will increase a " ' " to our balances.
We are going to deal with gross balances, therefore not taking into account the consumption of fixed capital, and to work - in current prices - the goods and services account, the current accounts and the capital account of the accumulation accounts.

Goods and Services Account - balanced by definition:

Resources

Output of goods and services	179 630
Imports of goods and services	35 490
Taxes on products net of subsidies	12 223
Total	227 346

Uses

Intermediate consumption	98 842
Final consumption expenditure/ actual final consumption	75 838
Gross capital formation	24 376
Exports of goods and services	28 291
Total	227 346

This account can be associated with SAM's "Products" account, belonging to the group of the "Production" accounts.

Thus:

Resources

Intermediate consumption	98 842
Final consumption expenditure/ actual final consumption of the national institutions in the economy	74 311
Gross capital formation	24 376
Exports of goods and services	28 291
Aggregate demand	225 819

Uses

Output of goods and services	179 633
Taxes on products received by the national institutions net of subsidies	12 014
Imports of goods and services plus taxes less subsidies on products received by the european union institutions	34 173
Aggregate supply	225 819

The difference between both accounts is in the "direct purchases abroad by residents" (1 527), considered in the SAM as a "current transfer to the rest of the world".

Production Account- that describes the transactions that constitute the appropriately named production process:

Resources

Output of goods and services	179 633
Taxes on products net of subsidies	12 223
Total	191 856

Uses

Intermediate Consumption	98 842
(B1g) Gross added value/gross domestic product	93 014
Total	191 856

We identified that account with the "Activities" account:

Resources

Output of goods and services	179 633

Uses

Intermediate consumption	98 842
Taxes on production net of subsidies	- 429

- receipt/expenditure of the (Portuguese) General Government … -366

- receipt/expenditure of the Institutions of the European Union … -63

(B1g') Gross added value 81 220
Total costs (net of subsidies to production) 179 633

We have, therefore, a gross added value (B1g') corresponding to gross domestic product at market prices (B1g) minus the net indirect taxes (on products and production). In other words, gross added value at factors cost (81 220 = 93 014 - (12 223- 429)).

Primary Distribution of Income Accounts – which show how primary incomes, that is incomes that accrue as a result of the involvement in processes of production or ownership of assets that may be needed for purposes of production, are distributed among institutions and activities:

- Generation of income account

Resources
(B1g) Gross added value/gross domestic product 93 014

Uses
Compensation of employees paid by the national institutions 44 585
Taxes on production and imports paid by the national institutions 13 491
Subsidies received by the national institutions ..... - 1 696
(B2g + B3g) Gross operating surplus + Gross mixed income 36 635
Total 93 014

- Allocation of primary income account

Resources
(B2g + B3g) Gross operating surplus + Gross mixed income 36 635
Compensation of employees received by the national institutions 44 610
Taxes on production and imports received by the national institutions 12 799
Subsidies paid by the national institutions ..... - 1 152
Property income received by the national institutions 26 411
Total 119 303

Uses
Property income paid by the national institutions 27 620
(B5g) Gross national income 91 683
Total 119 303

We can associate these accounts with the SAM's "Factors of Production" account that assumes the following form:

Resources
Compensation of employees (labour).....44 711
- Paid by the national institutions … 44 585
- " by the rest of the world …… 126
Compensation of capital 40 133
- (B2g' + B3g') Gross operating surplus + Gross mixed income … 36 635
- Paid by the rest of the world …… 3 497
Aggregate Income of Factors 84 843

Uses .....
Compensation of employees (labour).....44 711
- Received by the national institutions … 44 610
- " by the rest of the world …… 101
Compensation of capital 40 133
- Received by the national institutions … 35 426
- " by the rest of the world …… 4 707
Aggregate Income of Factors 84 843

In establishing the connection between those accounts, we have:

National product (B5g') = compensation of employees received by the national institutions + compensation of capital received by the national institutions ⇔ Gross national income (B5g) – (taxes on production and imports received by the national institutions – subsidies paid by the national institutions).

That is to say:

80 035 = 44 610 + 35 426 ⇔ 91 683 – (12 799 – 1152).

On the other hand:

Compensation of capital received by the national institutions = Gross operating surplus + Gross mixed income (B2g' + B3g' = B2g + B3g) + compensation of capital (or property income) paid by the rest of the world - compensation of capital (or property income) received by the rest of the world.

That is to say:

35 426 = 36 635 + 3497 - 4707

Secondary Distribution of Income, Redistribution of Income in Kind and Use of Disposable Income Accounts. The first two, show how the balance of primary incomes (national income) is transformed into disposable income by the receipt and payment of current transfers; the third shows how the gross disposable income is distributed between the final consumption and saving.

- Secondary distribution of income and redistribution of income accounts

Resources

(B5g) Gross national income	91 683
Current taxes on income, wealth, etc., received by the national institutions	8 925
Social contributions and benefits, received by the national institutions	38 917
- Social contributions	13 668
- Social benefits other than social transfers in kind	13 298
- Social transfers in kind	11 951
Other current transfers, received by the national institutions	17 784
Total	157 309

Uses

Current taxes on income, wealth, etc., paid by the national institutions	8 925
Social contributions and benefits, paid by the national institutions	38 924
- Social contributions	13 668
- Social benefits other than social transfers in kind	13 305
- Social transfers in kind	11 951
Other current transfers, paid by the national institutions	14 887
(B6/7g) Gross disposable income	94 572
Total	157 309

- Use of disposable income account

Resources

(B6/7g) Gross disposable income	94 572

Uses

Final consumption	75 838
(B8g) Gross saving	18 734
Total	94 572

Here is the SAM's "Current" account of the Institutions:

Resources

(B5g') National Product	80 035
- compensation of employees	44 610
- compensation of capital	35 426
Taxes on production paid to the national institutions net of subsidies	- 366
Taxes on products paid to the national institutions net of subsidies	12 014
Current transfers within the national institutions	53 061
Current transfers from the rest of the world	3 869
Aggregate income	148 613

Uses

Final consumption in the economy	74 311
Current transfers within the national institutions	53 061

Current transfers to the rest of the world.....2 507
- current transfers to the rest of the world ... 980
- direct purchases abroad by residents 1 527
(B8g') Domestic saving 18 734
Aggregate income.....148 613

We have, on the one hand, the SAM´s saving (B8g'), which we have called domestic saving, equivalent to the gross saving (B8g) and, on the other hand, the total of SAM's account, which we have named aggregate income, corresponding to the sum of the items:

gross national income (B5g) + current transfers within the national institutions + current transfers from the rest of the world (148 613 = 91 683 + 53 061 + 3 869)

or

gross disposable income (B6/7g) + current transfers within the national institutions + current transfers to the rest of the world (148 613 = 94 572 + 53 061 + 980)

Capital Account – this registers the non-financial investment transactions and the capital transfers, which are considered as the partition of the property transactions:

Resources
(B8g) Gross saving 18 734
Capital transfers received by the national institutions 8 153
Total.....26 887

Uses
Gross capital formation 24 376
Capital transfers paid by the national institutions 5 281
Acquisitions less disposals of non-produced non-financial assets ..... - 20
(B9) Net borrowing ..... - 2 750
Total.....26 887

We have the following SAM's "Capital" account:

Resources
(B8g') Domestic saving 18 734
Capital transfers within the national institutions.....5 148
Capital transfers from the rest of the world.....3 005
(B9') Net borrowing 2 750
Investment Funds.....29 637

Uses
Gross Capital Formation.....24 376

Capital transfers within the national institutions 5 148
Capital transfers to the rest of the world 114
- capital transfers ……... 133
- acquisitions less disposals of non-produced non-financial assets ... -20
Aggregate Investment.....29 637

The difference between the signals B9 and B9' has only to do with the composition of both accounts and the consideration or not of the capital transfers: one being considered as use and the other as resource.

As it can be seen, there is a strict relation between both capital accounts, being the difference between them, only the value of the net lending/borrowing.

Generally speaking, if it were not for the production taxation, the association of SAM accounts with national accounts would be perfect.

D. SAM modelling and the study of the effects of changes on economic flows between Portugal and the Other European Union Member States and Institutions

The SAM represents accounting identities, which specify behavioural relations. On the other hand, through its representation of accounts, it has the particularity of helping to identify the agents and variables of particular interest. In the case of the present study, the variables are all taken from those that represent non-financial transactions between Portugal and the European Union.

In order to use SAM as a theoretical structure, it is necessary, on the one hand, to classify accounts as endogenous or exogenous and, on the other hand, to fill up each cell with algebraic expressions, which describe in conceptual terms how the corresponding transaction values might be determined (Pyatt & Round, 1985; Pyatt, 1988). Therefore, we will have a matrix in the TV (Transaction Value) form that may indicate, more or less explicitly, a given theoretical economic thought.

Without showing preference for any particular line of thought, taking into account the scope of our work and the available data, as well as previously completed research, we

shall work with multipliers that we, like S. Robinson (1986), consider to be a stepping-stone leading to other more complex models.
Multipliers will allow us to analyse the impact and repercussions of the exogenous changes made to the part of the economy that we call endogenous.

We shall start by systematising the base methodology of the multipliers, according to G. Pyatt and A. Roe's 1977 work (with some adaptations), which we consider to be the basis of what has so far been done in this area.

SAM in endogenous and exogenous accounts:

		EXPENDITURES				TOTAL
		Endogenous	Σ	Exogenous	Σ	
RECEIPTS	Endogenous	$N = A_n * \hat{y}_n$	n	X	x	$y_n = n + x$ $y_n = A_n * y_n + x$
	Exogenous	$L = A_l * \hat{y}_n$	l	R	r	$y_x = l + r$ $y_x = A_l * y_n + r$
TOTAL		$y_n' = (i' * A_n + i' * A_l) * \hat{y}_n$ $i' = i' * A_n + i' * A_l$		$y_x' = i' * X + i' * R$ $A_l * y_n - X' = (R - R') * i$ [4]		

Where:

N = matrix of transactions between endogenous accounts
n = vector of the row sum of N

X = matrix of the transactions between exogenous and endogenous accounts (injections from first into second) [X': transposed matrix]
x = vector of the row sum of X

L = matrix of the transactions between endogenous and exogenous accounts (leakages from first into second)
l = vector of the row sum of L

R = Matrix of the transactions between exogenous accounts [R': transposed matrix]
r = vector of the row sum of R

y_n = vector (column) of the receipts of the endogenous accounts

y_n' = " (row) of the expenditures " " " "

[4] This equation states that the column sums of the exogenous accounts have to be equal with the row sums, that is, $X' * i + R' * i = l + r \Leftrightarrow X' * i + R' * i = A_l * y_n + R * i \Leftrightarrow A_l * y_n - X' * i = R' * i - R' * i \Leftrightarrow A_l * y_n - X' * i = (R - R') * i$.

$\hat{y}_n$= matrix (diagonal) of the receipts " " " ($\hat{y}_n^{-1}$: inverse)

y_x = vector (column) of the receipts " " exogenous "

y_x' = " (row) of the expenditures " " " "

i = unitary vector (column) [i': unitary vector (row)]

We can also see that, in aggregate terms, the total of the injections from the exogenous accounts into the endogenous (i.e. the column sum of "x") is equal to the total of the leakages from the endogenous accounts into the exogenous (i.e. the column sum of "l"):

$$x' * i = l' * i = i' * A_l * y_n$$

In other words, the amount that the endogenous accounts receive is equal to the amount that they pay – using the words of Pyatt: "a SAM is a simple and efficient way of representing the fundamental law of economics: for every income there is a corresponding outlay or expenditure." (Pyatt, 1988).

Having said that, we can now deduce the accounting multipliers[5], which will allow for further analysis.

In the previous structure:

$A_n = N * \hat{y}_n^{-1}$ = matrix (squared) of the average expenditure propensities of the endogenous accounts in the endogenous accounts or the use of resources within those accounts;

$A_l = L * \hat{y}_n^{-1}$ = matrix (non squared) of the average expenditure propensities of the endogenous accounts in the endogenous accounts or the use of resources from the endogenous accounts within the exogenous accounts.

Therefore: $y_n = n + x = A_n * y_n + x = (I-A_n)^{-1} * x = M_a * x$

We thus have the equation that gives us the receipts of the endogenous accounts (y_n), by multiplying the injections "x" by the matrix of the accounting multipliers: $M_a = (I-A_n)^{-1}$.

In the same way: $l = A_l * y_n = A_l * (I-A_n)^{-1} * x = A_l * M_a * x$.

[5] In this type of approach, fixed price multipliers can also be used. They will not be mentioned. According to previous studies, their results are even further from reality.

So, with the accounting multipliers, the impact of the changes in receipts is analysed at the immediate moment, assuming that the structure of expenditures in the economy does not change. This type of methodology allows us to make a static analysis, assuming that there are excess capacity, prices remain constant and the production technology and resource endowment are given.

The fact that the present study concentrates on the flows of funds between Portugal and the European Union led us to consider the accounts relating to the domestic economy, as well as the errors and omissions, as being endogenous accounts. As a result of this, the accounts of the rest of the world are considered as exogenous accounts.
Therefore, the endogenous accounts (i.e. the domestic economy accounts) are those for which changes in the level of outlays directly follow any changes in income, while exogenous accounts (i.e. the rest of the world accounts) are those for which we assume that outlays are set independently of changes in income.

We started from the following SAM outline, with the accounts being grouped together as endogenous and exogenous:

Outlays (expenditures) j / Incomes (receipts) i				ENDOGENOUS						EXOGENOUS	TOTAL
				Production			Institutions		Errors and Omiss.	Rest of the World	
				Factors	Activ.	Products	Current A.	Capital A.			
				1 e 2	3,4,5	6,7,8	9,10,11,12	13,14,15,16	19	17 e 18	
ENDOGENOUS	Production	Factors	1 e 2	0	AV	0	0	0	0	CF←rw	IF
		Activities	3,4,5	0	0	P	0	0	0	0	P
		Products	6,7,8	0	IC	0	FC	GCF	0	EX	D
	Institutions	Current Account	9,10,11,12	NP	nta	ntp	CT	0	0	CT←rw	Inc
		Capital Account	13,14,15,16	0	0	0	DS	KT	nL/B	KT←rw	I
	Errors and Omissions		19	0	0	cm	0	0	0	nL/B	nL/B
EXÓGENOUS	Rest of the World		17,18	CF→rw	nta→rw	IM	CT→rw	KT→rw	0	X	TV→rw
TOTAL				IF	TC	S	Inc	I	nL/B	TV←rw	X

where:

AV = Added Value

CF = Compensation of Factors

cm = commercial margins

CT = Current Transfers

D = Aggregate Demand

DS = Domestic Saving

EX = Exports

FC = Final Consumption

GCF = Gross Capital Formation

I = Aggregate Investment / Investment funds

IC = Intermediate Consumption

IF = Aggregate Income of Factors

IM = Imports

Inc = Aggregate Income

KT = Capital Transfers

nL/B = Net Lending/Borrowing

NP = National Product

nta = Other net taxes on production

ntp = net taxes on products

P = Production value

S = Aggregate Supply

TC = Total Costs

TV = Transactions Value

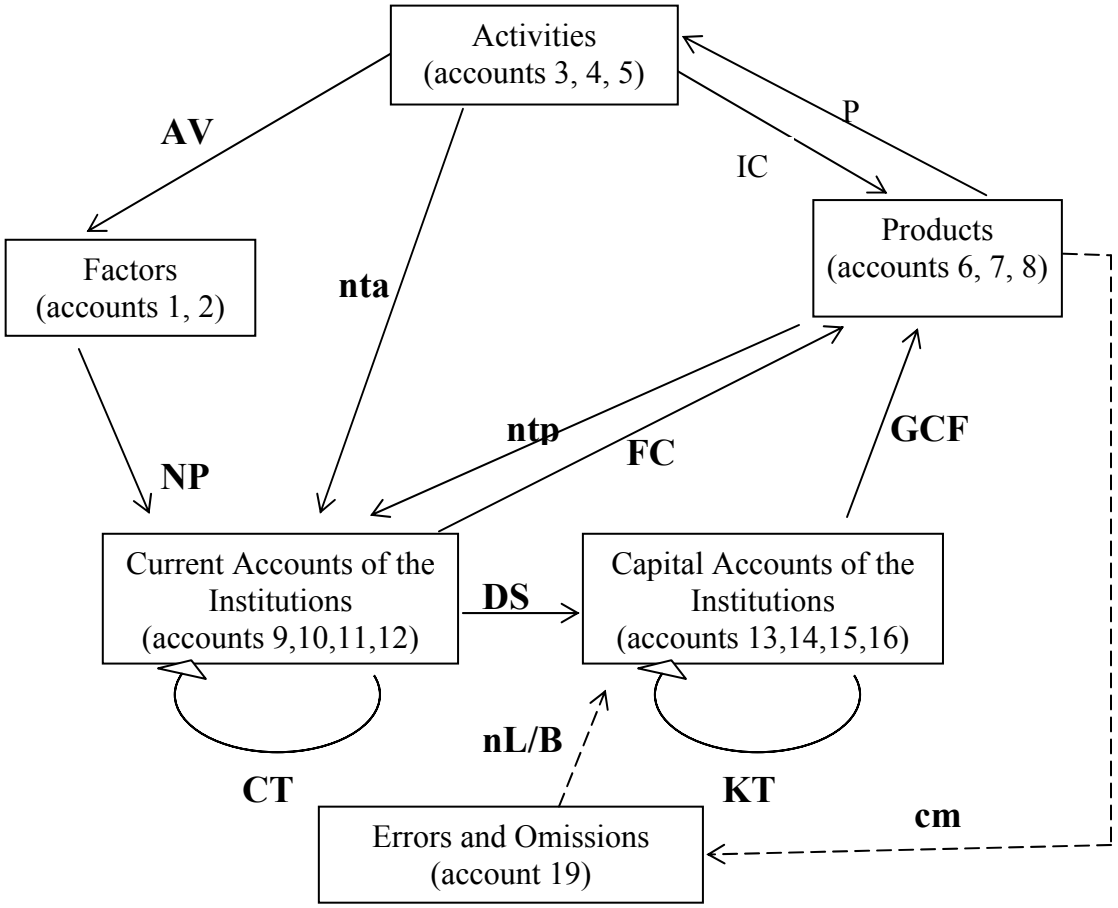
... $\rightarrow$ rw = ... to the rest of the world

... $\leftarrow$ rw = ... from the rest of the world

As a result, we have the following matrix of transactions between endogenous accounts:

$$N = \begin{bmatrix} 0 & AV & 0 & 0 & 0 & 0 \\ 0 & 0 & P & 0 & 0 & 0 \\ 0 & IC & 0 & FC & GCF & 0 \\ NP & nta & ntp & CT & 0 & 0 \\ 0 & 0 & 0 & DS & KT & nL/B \\ 0 & 0 & cm & 0 & 0 & 0 \end{bmatrix}$$

The sub-matrices of the above matrix represent the following flows:



It is known that:

$$N = A_n * \hat{y}_n = \begin{bmatrix} 0 & A_{AV} & 0 & 0 & 0 & 0 \\ 0 & 0 & A_P & 0 & 0 & 0 \\ 0 & A_{IC} & 0 & A_{FC} & A_{GCF} & 0 \\ A_{NP} & A_{nta} & A_{ntp} & A_{CT} & 0 & 0 \\ 0 & 0 & 0 & A_{DS} & A_{KT} & A_{nL/B} \\ 0 & 0 & A_{cm} & 0 & 0 & 0 \end{bmatrix} * \begin{bmatrix} IF & 0 & 0 & 0 & 0 & 0 \\ 0 & P & 0 & 0 & 0 & 0 \\ 0 & 0 & D & 0 & 0 & 0 \\ 0 & 0 & 0 & Inc & 0 & 0 \\ 0 & 0 & 0 & 0 & I & 0 \\ 0 & 0 & 0 & 0 & 0 & nL/B \end{bmatrix}$$

Considering that, the non-null elements of A_n (average expenditure propensities of the endogenous accounts in the endogenous accounts) are sub-matrices of the n_{ij}/y_j elements, with:

i = 9, 10, 11, 12 and j = 1,2, in A_{NP};
i = 1,2 and j = 3, 4, 5, in A_{AV};
i = 6,7,8 and j = 3, 4, 5, in A_{IC};
i = 9,10,11,12 and j = 3,4,5, in A_{nta};
i = 3, 4, 5 and j = 6, 7, 8, in A_{P};
i = 9,10,11,12 and j = 6,7,8, in A_{ntp};
i = 19 and j = 6,7,8, in A_{cm};
i = 6, 7, 8 and j = 9, 10, 11, 12, in A_{FC};
i and j = 9, 10, 11, 12, in $A_{CT;}$
i = 13, 14, 15, 16 and j = 9, 10, 11, 12, in $A_{DS;}$
i = 6, 7, 8 and j = 13, 14, 15, 16, in A_{GCF};
i and j = 13, 14, 15, 16, in $A_{KT;}$
i = 13, 14, 15, 16 and j = 19, in $A_{nL/B}$.

The injections "x" (from the exogenous into the endogenous accounts), which are the whole range of shocks that can be performed, consist of: compensation of factors from the rest of the world, exports, current transfers from the rest of the world, capital transfers from the rest of the world and net lending/borrowing. In our case, these are not very representative in absolute and relative terms, with the exception of net lending (as we can see in the following table).

Importance of the receipts from the Rest of the World accounts (exogenous) in the total of the Production and Domestic Institutions accounts (endogenous) receipts, in 1997

		From European Union		From other countries		Total Incomes	
		Million Euros	%	Million Euros	%	Million Euros	%
Production	Factors of Production	2 103	2,5	1 520	1,8	84 843	100,0
		(compensation of factors from the rest of the world)					
	Products	22 308	9,9	5 983	2,6	225 819	100,0
		(exports)					
Institutions	Current Account	2 485	1,7	1 384	0,9	148 613	100,0
		(current transfers from the rest of the world)					
	Capital Account	2 807	9,5	198	0,7	29 637	100,0
		(capital transfers from the rest of the world)					
Errors and Omissions (net lending)		1 398	50,8	1 352	49,2	2 750	100,0

Source: SAM for Portugal in 1997

The leakages "1" (from the endogenous accounts into the exogenous accounts), which are of little significance in our case, consist of: compensation of factors to the rest of the world, other net taxes on production to the rest of the world, imports, current transfers to the rest of the world and capital transfers to the rest of the world, as we can see in the following table.

Importance of the expenditures in the Rest of the World accounts (exogenous) in the total of the expenditures in the Production and Domestic Institutions accounts (endogenous), in 1997

		To European Union		To other countries		Total Outlays	
		Million Euros	%	Million Euros	%	Million Euros	%
Production	Factors of Production	3 364	4,0	1 444	1,7	84 843	100,0
		(compensation of factors to the rest of the world)					
	Activities	-63	0,0	–	–	179 633	100,0
		(other net taxes on production to the rest of the world)					
	Products	25 924	11,5	8 249	3,7	225 819	100,0
		(imports)					
Institutions	Current Account	1 828	1,2	679	0,5	148 613	100,0
		(current transfers to the rest of the world)					
	Capital Account	47	0,2	66	0,2	29 637	100,0
		(capital transfers to the rest of the world)					

Source: SAM for Portugal in 1997

Now we will analyse the effects or impact of the changes on the "x" vector, in other words, on the receipts from the Rest of the World accounts (expenditures of the exogenous accounts), as well as on the receipts and expenditures of the endogenous accounts (production and national institutions, errors and omissions), using the accounting multipliers. We are therefore assuming that, with these changes, the structure of the expenditures of the endogenous accounts – shown in the following table – will not suffer any changes.

Aggregate structure of the expenditures of the Production and Domestic Institutions accounts, in 1997

			ENDOGENOUS					
			Production			Institutions		Errors and Omissions
			Factors	Activities	Products	Current A.	Capital A.	
ENDOGENOUS	Production	Factors	0	0,45	0	0	0	0
		Activities	0	0	0,80	0	0	0
		Products	0	0,55	0	0,50	0,82	0
	Institutions	Current Account	0,94	0,00	0,05	0,36	0	0
		Capital Account	0	0	0	0,13	0,17	1,00
	Errors and Omissions		0	0	0,00	0	0	0
EXÓG.	Rest of the World		0,06	0,00	0,15	0,02	0,00	0
TOTAL			1,00	1,00	1,00	1,00	1,00	1,00

Source: A_n and A_l Matrices (see Annexes)

All the investment grants coming from the European Union were cut from the matrix of capital transfers from the rest of the world, which led to a fall of 91,1% in its total. After that, according to the pre-defined methodology and using the matrix of accounting multipliers, it was possible to calculate the new vector of receipts in the endogenous accounts (y_n). From this, and with the aid of the average expenditure propensities matrices (A_n e A_l), the new SAM was re-calculated. In aggregate terms, this gives us the following changes.

Impact of the cuts in investment grants from the European Union

			ENDOGENOUS						END OG.	TOTAL
			Production			Institutions		Errors and Omissions	Rest of the World	
			Factors	Activities	Products	Current A.	Capital A.			
ENDOGENOUS	Production	Factors	0	-5,9%	0	0	0	0	0,0%	-5,6%
		Activities	0	0	-6,0%	0	0	0	0	-6,0%
		Products	0	-6,2%	0	-5,5%	-16,1%	0	0,0%	-6,3%
	Institutions	Current Account	-5,6%	-5,8%	-6,4%	-5,7%	0	0	0,0%	-5,6%
		Capital Account	0	0	0	-5,5%	-31,0%	-9,0%	**-91,1%**	-18,9%
	Errors and Omissions		0	0	0	0	0	X	-9,2%	-9,2%
EXÓG.	Rest of the World		-5,4%	-9,5%	-6,6%	-5,5%	-80,9%	0	X	-6,6%
TOTAL			-5,6%	-6,0%	-6,3%	-5,6%	-18,9%	-9,2%	-6,6%	X

Source: SAM for Portugal in 1997 and estimated SAM after the cuts in investment grants from the European Union

With the disaggregation that we worked with, we shall now look in greater detail at the impact of such measures on the sub-matrices that were most affected. In other words, we shall look at the sub-matrices included in the capital account of the institutions.

At the expenditure level of the domestic institutions, providing its structure was maintained, behaviour was seen to be identical in terms of gross capital formation, capital transfers within domestic institutions and from them to the rest of the world, as well as in terms of total aggregate investment:

- Households … -7,5%
- Enterprises ... –15,5%
- Government ... –33,9%
- Others ... –10,5%

At the receipt level within the sub-matrices, the amounts are those given above. Derived from them are the following total variations:

Gross Capital Formation

- on primary sector products ... – 8,1%
- on secondary sector products ... – 16,5%
- on tertiary sector products… - 12,9%
- Total … - 16,1 %

Capital Transfers within domestic institutions

- incomes or receipts of the households … - 28,3%
- incomes or receipts of the enterprises ... – 33,9%
- incomes or receipts of the government ... – 30,6%
- incomes or receipts of the other institutions ... – 29,0%
- Total … -31,0 %

Capital Transfers to the rest of the world

- European Union … - 270,2%
- Others ... 53,5%
- Total … -80,9 %

Although the effect of the cuts in investment grants from the European Union had had repercussions throughout the domestic economy, it was felt with much greater intensity in the institutions' capital account. The Government was the institution whose level of capital outlays was worst affected. As for capital incomes, gross capital formation on secondary sector products, those capital transfers within domestic institutions that are

the income of the enterprises and capital transfers to the European Union, were the worst affected.

We can find here effects that should be analysed as representing a mere indication, considering the underlying assumptions in the methodology used, namely a demand-driven economy, fixed expenditure coefficients or unitary expenditure elasticities to the endogenous accounts, fixed prices and exogenous accounts, for which the used outlays are set independently of changes in income.

E. Conclusions

Although there is no significant expressiveness, from the analysis of the flows of funds between Portugal and the rest of the world in 1997, we can conclude that those registered with the Other Economic Union Member States and Institutions were more important than those registered with Third Countries and International Organisations. On the other hand, with more or less restrictive assumptions and in static terms, the SAM was the work instrument that enabled us to analyse the impact on the Portuguese economy of changes in such flows, namely the cuts in investment grants received from the European Union. As has been shown, such a possibility results from the way that the SAM represents the circular flow in economy, "the essence of the multiplier process and the interdependence of income distribution and the structure of production" (Pyatt, 1999).

Given that the National Accounts provided the source of information for the constructed SAM, I would also like to share the conclusion drawn by Pyatt (1999), who states "the SAM is more fundamental, in the sense of being a sufficient statistic for the other data systems" (T-accounts or national accounts, commodity balances, Input-Output Tables) "and, in practice, has distinct advantages of two types. One of these advantages is the reduction of the risk of confusion, …A second advantage in practice is the emphasis on consistency and the importance of complete articulation, both of which are of the essence of trying to understand feedback systems, in general, and the interdependence of distribution of income and the structure of production, in particular".

The SAM therefore is a work instrument that provides a database that can be specially adapted for specific economic analysis, as well as for decision-taking and decision-making. Its improvement and institutionalisation represent a challenge.

Given such a situation, I should like to finish with the assertions made by two respected experts:

- Faye Duchin[6], "our"(I/O economists) "strength is our ability to deal with specifics that reach into both the material world and the social world in a way that is formalized in structured databases and mathematical models"…"the SAM is a formal framework that offers the possibility of structural representation …, but its potential for description, let alone for analysis, has barely been tapped. The SAMs that have been produced in statistical offices so far are much too aggregated to provide insight into social practices".

- Steven J. Keuning[7], "a System of Economic and Social Accounting Matrix and Extensions (SESAME) yields a synthesis of the national accounts and social indicators approach …. [is] a multipurpose information system that can be used to test economic and social theories. It is this property that has made the national accounts the universal language of economics. It is hoped that the SESAME will open the door to an even richer insight into the state of human development"

[6] "Global Environmental Degradation in the 21st Century: A Challenge for Input-Output Economics" at the 14th International Conference on Input-Output Techniques, Montreal - Canada, October 2002.

[7] "SESAME: an Integrated Economic and Social Accounting System", in: *International Statistical Review*, 65(1): 111-121 April 1997

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ANNEXES

1. Description of the SAM's cell contents

Row	Col.	Contents
1	3	Compensation of employees paid by primary sector activities
1	4	Compensation of employees paid by secondary sector activities
1	5	Compensation of employees paid by tertiary sector activities
1	17	Compensation of employees paid by the institutions and the other member states of the European Union (from non-resident employers)
1	18	Compensation of employees paid by the rest of the world (from non-resident employers)
2	3	Gross operating surplus of primary sector activities
2	4	Gross operating surplus of secondary sector activities
2	5	Gross operating surplus of tertiary sector activities
2	17	Property income paid by the institutions and the other member states of the European Union
2	18	Property income paid by the rest of the world
3	6	Output of primary sector products through the activities of the same sector
3	8	Output of tertiary sector products through the activities of the primary sector
4	6	Output of primary sector products through the activities of the secondary sector
4	7	Output of secondary sector products through the activities of the same sector
4	8	Output of tertiary sector products through the activities of the secondary sector
5	6	Output of primary sector products through the activities of the tertiary sector
5	7	Output of secondary sector products through the activities of the tertiary sector
5	8	Output of tertiary sector products through the activities of the same sector
6	3	Intermediate consumption of primary sector products through the activities of the same sector

Row	Col.	Contents
6	4	Intermediate consumption of primary sector products through secondary sector activities
6	5	Intermediate consumption of primary sector products through tertiary sector activities
6	9	Household actual final consumption of primary sector products
6	11	Government actual final consumption of primary sector products
6	13	Gross Capital Formation on primary sector products by the enterprises classified in households institutional sector
6	14	Gross Capital Formation on primary sector products by the non-financial corporations
6	15	Gross Capital Formation on primary sector products by the government
6	17	Exports of primary sector products to the other member states of the European Union
6	18	Exports of primary sector products to the rest of the world
7	3	Intermediate consumption of secondary sector products by primary sector activities
7	4	Intermediate consumption of secondary sector products by the activities of the same sector
7	5	Intermediate consumption of secondary sector products by tertiary sector activities
7	9	Household actual final consumption of secondary sector products
7	11	Government actual final consumption of secondary sector products
7	13	Gross Capital Formation on secondary sector products by the enterprises classified in the households institutional sector
7	14	Gross Capital Formation on secondary sector products by the non-financial corporations
7	15	Gross Capital Formation on secondary sector products by the government
7	16	Gross Capital Formation on secondary sector products by the financial corporations and non-profit institutions serving households
7	17	Exports of secondary sector products to the other member states of the European Union
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8	3	Intermediate consumption of tertiary sector products through primary sector activities
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8	5	Intermediate consumption of tertiary sector products through the activities of the same sector
8	9	Household actual final consumption of tertiary sector products
8	11	Government actual final consumption of tertiary sector products
8	13	Gross Capital Formation on tertiary sector products by the enterprises classified in households institutional sector
8	14	Gross Capital Formation on tertiary sector products by the non-financial corporations
8	15	Gross Capital Formation on tertiary sector products by the government
8	16	Gross Capital Formation on tertiary sector products by the financial corporations and non-profit institutions serving households
8	17	Exports of tertiary sector products to the other member states of the European Union (includes direct purchases in domestic market by non-residents)
8	18	Exports of tertiary sector products to the rest of the world (includes direct purchases in domestic market by non-residents)
9	1	Wages and salaries plus imputed social contributions received by households
9	2	Gross mixed income plus net property income received by households
9	9	Social benefits other than social transfers in kind and miscellaneous current transfers within households
9	10	Social benefits other than social transfers in kind and miscellaneous current transfers from the non-financial corporations to the households
9	11	Social benefits other than social transfers in kind, social transfers in kind and miscellaneous current transfers from the government to the households
9	12	Social benefits other than social transfers in kind received by households from the financial corporations and non-profit institutions serving

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		households; social transfers in kind from non-profit institutions serving households to the household; non-life insurance claims from the financial corporations to households; adjustment for the change in net equity of households on pension funds
9	17	Social benefits other than social transfers in kind, non-life insurance claims and miscellaneous current transfers received by households from institutions and the other member states of the European Union
9	18	Social benefits other than social transfers in kind, non-life insurance claims and miscellaneous current transfers received by households from the rest of the world
10	1	Imputed social contributions received by non-financial corporations
10	2	Gross operating surplus plus net property income received by non-financial corporations
10	10	Miscellaneous current transfers within non-financial corporations
10	11	Miscellaneous current transfers from the government to the non-financial corporations
10	12	Non-life insurance claims and miscellaneous current transfers from financial corporations to non-financial corporations
10	17	Non-life insurance claims received by the non-financial corporations from the institutions and the other member states of the European Union
10	18	Non-life insurance claims received by non-financial corporations from the rest of the world
11	1	Imputed social contributions received by the government plus employers' actual social contributions received by social security funds
11	2	Gross operating surplus plus net property income received by the government
11	3	Other taxes on production paid by primary sector activities minus other subsidies on production received by the same activities from the government
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11	5	Other taxes on production paid by tertiary sector activities minus other subsidies on production received by the same activities from the government
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11	8	Taxes on tertiary sector received by the government minus subsidies on those products from the government
11	9	Current taxes on income, wealth, etc., employees' social contributions, social contributions by self-employed and non-employed persons and miscellaneous current transfers received by the government from households
11	10	Current taxes on income, wealth, etc., and miscellaneous current transfers received by the government from non-financial corporations
11	11	Current transfers and miscellaneous current transfers within the government
11	12	Current taxes on income, wealth, etc. paid by the financial corporations and non-profit institutions serving households to the government; non-life insurance claims paid by the financial corporations to the government; miscellaneous current transfers from the financial corporations and non-profit institutions serving households to the government
11	17	Current international cooperation and miscellaneous current transfers received by the government from institutions and the other member states of the European Union
11	18	Current international cooperation and miscellaneous current transfers received by the government from the rest of the world
12	1	Imputed social contributions received by the financial corporations and non-profit institutions serving households
12	2	Gross operating surplus plus net property income received by the financial corporations and non-profit institutions serving households
12	9	Employees' social contributions, social contributions by self-employed

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		and non-employed persons and net non-life insurance premiums received by the financial corporations from households; miscellaneous current transfers from the households to the non-profit institutions serving households
12	10	Net non-life insurance premiums received by the financial corporations from the non-financial corporations; miscellaneous current transfers from the non-financial corporations to the financial corporations and non-profit institutions serving households
12	11	Net non-life insurance premiums received by the financial corporations from the government; miscellaneous current transfers from the government to the non-profit institutions serving households
12	12	Net non-life insurance premiums paid by the financial corporations and the non-profit institutions serving households to the financial corporations; non-life insurance claims paid by the financial corporations to themselves and to the non-profit institutions serving households; miscellaneous current transfers from the financial corporations to the non-profit institutions serving households and within the last ones
12	17	Net non-life insurance premiums and non-life insurance claims received by the financial corporations from the institutions and the other member states of the European Union
12	18	Net non-life insurance premiums and non-life insurance claims received by the financial corporations from the rest of the world
13	9	Gross saving of households
13	15	Investment grants and other capital transfers from the government to households
13	16	Other capital transfers from the financial corporations to households
13	17	Investment grants and other capital transfers from the institutions and the other member states of the European Union to households
13	18	Other capital transfers from the rest of the world to households
13	19	Net lending of households
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14	18	Other capital transfers from the rest of the world to the non-financial corporations
14	19	Net borrowing of the non-financial corporations
15	11	Gross saving of the government
15	13	Capital taxes and other capital transfers received by the government from households
15	14	Other capital transfers from the non-financial corporations to the government
15	15	Investment grants and other capital transfers within the government
15	16	Other capital transfers from the financial corporations and the non-profit institutions serving households to the central and local governments
15	17	Investment grants and other capital transfers from the institutions and the other member states of the European Union to the government
15	18	Investment grants and other capital transfers from the rest of the world to the local government
15	19	Net borrowing of the government
16	12	Gross saving of the financial corporations and non-profit institutions serving households
16	15	Investment grants and other capital transfers from the government to the non-profit institutions serving households
16	16	Other capital transfers within the financial corporations
16	17	Investment grants from the institutions and the other member states of the European Union to the non-profit institutions serving households
16	19	Net lending of the financial corporations and non-profit institutions serving households
17	1	Compensation of employees received by the institutions and the other member states of the European Union (to non-resident employees)
17	2	Property income received by the institutions and the other member states

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17	3	Minus other subsidies on production received by primary sector activities from the institutions and the other member states of the European Union
17	4	Minus other subsidies on production received by secondary sector activities from the institutions and the other member states of the European Union
17	6	Imports of primary sector products from the other member states of the European Union plus the part of taxes on those products received by the institutions of the European Union minus the part of the subsidies for those products received from the same institutions
17	7	Imports of secondary sector products from the other member states of the European Union plus the part of taxes on those products received by the institutions of the European Union minus the part of the subsidies for those products received from the same institutions
17	8	Imports of tertiary sector products from the other member states of the European Union plus the part of taxes on those products received by the institutions of the European Union minus the part of the subsidies for those products received from the same institutions
17	9	Net non-life insurance premiums and miscellaneous current transfers received by the institutions and the other member states of the European Union from the households; direct purchases in the other member states of the European Union by residents
17	10	Net non-life insurance premiums received by the institutions and the other member states of the European Union from the non-financial corporations
17	11	Net non-life insurance premiums, current international cooperation, miscellaneous current transfers and social benefits other than social transfers in kind received by the institutions and the other member states of the European Union from the government
17	12	Net non-life insurance premiums received by the institutions and the other member states of the European Union from the financial corporations and the non-profit institutions serving households; non-life insurance claims received by the institutions and the other member states of the European

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		Union from the financial corporations
17	13	Acquisitions minus disposals of non-produced non-financial assets and other capital transfers from households to the institutions and the other member states of the European Union
17	14	Acquisitions minus disposals of non-produced non-financial assets and other capital transfers from the non-financial corporations to the institutions and the other member states of the European Union
17	15	Acquisitions minus disposals of non-produced non-financial assets, investment grants and other capital transfers from the government to the institutions and the other member states of the European Union
17	16	Acquisitions minus disposals of non-produced non-financial assets from the financial corporations to the institutions and the other member states of the European Union
18	1	Compensation of employees received by the rest of the world (non-resident employees)
18	2	Property income received by the rest of the world
18	6	Imports of primary sector products from the rest of the world
18	7	Imports of secondary sector products from the rest of the world
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18	9	Net non-life insurance premiums and miscellaneous current transfers received by the rest of the world from the households; direct purchases in the rest of the world by residents
18	10	Net non-life insurance premiums received by the rest of the world from the non-financial corporations
18	11	Net non-life insurance premiums, current international cooperation, miscellaneous current transfers and social benefits other than social transfers in kind received by the rest of the world from the government
18	12	Net non-life insurance premiums received by the rest of the world from the financial corporations and non-profit institutions serving households; non-life insurance claims received by the rest of the world from the financial corporations
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18	14	Acquisitions minus disposals of non-produced non-financial assets and other capital transfers from the non-financial corporations to the rest of the world
18	15	Acquisitions minus disposals of non-produced non-financial assets, investment grants and other capital transfers from the central government to the rest of the world
18	16	Acquisitions minus disposals of non-produced non-financial assets from the financial corporations to the rest of the world
19	6	Trade margins of primary sector products
19	7	Trade margins of secondary sector products
19	8	Trade margins of tertiary sector products
19	17	Net lending of the institutions and the other member states of the European Union
19	18	Net lending of the rest of the world

2. AVERAGE EXPENDITURE PROPENSITIES MATRICES

➔ $A_n = N * \hat{y}_n^{-1}$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19
1	0,000	0,000	0,100	0,170	0,327	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
2	0,000	0,000	0,480	0,146	0,236	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
3	0,000	0,000	0,000	0,000	0,000	0,665	0,003	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
4	0,000	0,000	0,000	0,000	0,000	0,000	0,592	0,007	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
5	0,000	0,000	0,000	0,000	0,000	0,000	0,002	1,137	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
6	0,000	0,000	0,091	0,060	0,005	0,000	0,000	0,000	0,030	0,000	0,001	0,000	0,022	0,000	0,000	0,000	0,000
7	0,000	0,000	0,304	0,545	0,160	0,000	0,000	0,000	0,361	0,000	0,020	0,000	0,917	0,793	0,466	0,772	0,000
8	0,000	0,000	0,050	0,079	0,275	0,000	0,000	0,000	0,382	0,000	0,160	0,000	0,138	0,137	0,002	0,112	0,000
9	0,786	0,523	0,000	0,000	0,000	0,000	0,000	0,000	0,005	0,097	0,540	0,561	0,000	0,000	0,000	0,000	0,000
10	0,033	0,325	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,005	0,000	0,066	0,000	0,000	0,000	0,000	0,000
11	0,154	-0,023	-0,015	-0,001	-0,002	0,000	0,064	0,040	0,107	0,199	0,227	0,063	0,000	0,000	0,000	0,000	0,000
12	0,025	0,058	0,000	0,000	0,000	0,000	0,000	0,000	0,019	0,034	0,028	0,017	0,000	0,000	0,000	0,000	0,000
13	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,074	0,000	0,000	0,000	0,000	0,000	0,035	0,056	-0,342
14	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,661	0,000	0,000	0,000	0,000	0,129	0,000	0,386
15	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,010	0,000	0,055	0,005	0,318	0,005	1,209
16	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,282	0,000	0,000	0,042	0,056	-0,252
19	0,000	0,000	0,000	0,000	0,000	0,146	0,129	-0,232	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000

➔ $A_l = L * \hat{y}_n^{-1}$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19
17	0,001	0,082	-0,009	0,000	0,000	0,136	0,162	0,033	0,016	0,002	0,009	0,008	-0,218	0,098	0,009	0,000	0,000
18	0,001	0,035	0,000	0,000	0,000	0,052	0,049	0,014	0,005	0,001	0,005	0,002	0,086	-0,033	-0,003	0,000	0,000

➔ Column Sum

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19
	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

3. ACCOUNTING MULTIPLIERS MATRIX

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	19
1	2,239	1,030	1,141	1,216	1,578	0,885	0,918	1,657	1,243	1,057	1,291	1,155	1,141	0,960	0,937	1,018	0,855
2	1,007	1,841	1,359	1,023	1,246	1,009	0,770	1,301	1,011	0,866	1,041	0,944	0,951	0,793	0,782	0,843	0,713
3	0,172	0,145	1,212	0,191	0,162	0,825	0,144	0,163	0,175	0,148	0,168	0,163	0,181	0,138	0,144	0,149	0,128
4	1,847	1,649	1,805	2,920	1,797	1,480	2,097	1,696	1,859	1,874	1,802	1,894	2,302	1,905	2,047	2,060	1,902
5	2,776	2,250	2,180	2,140	3,842	1,684	1,673	4,136	2,780	2,214	2,959	2,498	2,238	1,902	1,755	1,997	1,585
6	0,245	0,206	0,304	0,273	0,230	1,229	0,201	0,232	0,249	0,208	0,239	0,231	0,255	0,193	0,201	0,208	0,178
7	3,092	2,763	3,027	3,222	3,006	2,483	3,525	2,821	3,111	3,143	3,013	3,174	3,866	3,200	3,441	3,461	3,198
8	2,437	1,975	1,913	1,878	2,496	1,478	1,467	3,634	2,441	1,943	2,598	2,193	1,963	1,669	1,539	1,752	1,390
9	3,207	2,526	2,303	2,166	2,696	1,763	1,691	2,841	3,301	2,186	3,064	2,758	2,076	1,739	1,716	1,849	1,569
10	0,418	0,651	0,495	0,386	0,473	0,369	0,291	0,495	0,385	1,336	0,399	0,427	0,359	0,300	0,295	0,319	0,269
11	1,356	1,008	0,968	0,978	1,153	0,758	0,840	1,236	1,161	1,199	2,437	1,157	1,004	0,839	0,844	0,896	0,775
12	0,233	0,236	0,200	0,176	0,216	0,151	0,136	0,228	0,203	0,202	0,239	1,205	0,167	0,140	0,138	0,149	0,126
13	0,281	0,213	0,178	0,159	0,251	0,089	0,087	0,345	0,287	0,171	0,285	0,245	1,138	0,117	0,153	0,179	-0,205
14	0,201	0,390	0,325	0,270	0,220	0,343	0,283	0,058	0,180	0,879	0,161	0,246	0,300	1,235	0,460	0,258	0,864
15	-0,189	-0,094	0,014	0,063	-0,242	0,298	0,275	-0,745	-0,188	0,010	-0,259	-0,077	0,249	0,125	1,700	0,161	1,977
16	0,097	0,086	0,063	0,050	0,096	0,017	0,015	0,154	0,087	0,065	0,108	0,375	0,040	0,033	0,086	1,092	-0,172
19	-0,132	-0,073	-0,010	0,019	-0,159	0,156	0,143	-0,447	-0,130	-0,016	-0,181	-0,067	0,079	0,053	0,115	0,069	1,115